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AN ANALYSIS OF SCHOOL LIBRARY MEDIA CENTERS IN SOUTH CAROLINA ELEMENTARY AND MIDDLE SCHOOLS IN 2005

By

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Preface

In Fall 2005 the South Carolina Department of Education (SCDE) requested that the School of Library and Information Science (SLIS), University of South Carolina, analyze the data from a survey of school library media centers conducted by the SCDE for school year 2005. This report represents the product of that analysis. The authors wish to thank the Martha Alewine of the SCDE, Martha Taylor of the South Carolina Association of School Librarians, and the SLIS for supporting this study.

The authors are solely responsible for the analysis and conclusions of this report. The analysis does not necessarily reflect the views of the SCDE, the South Carolina Association of School Librarians, the University of South Carolina, or the SLIS.

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1.0 Introduction

In Fall 2005, the South Carolina Department of Education (SCDE) asked the School of Library and Information Science (SLIS), University of South Carolina to conduct an analysis of the data derived from a SCDE sponsored survey of school library media specialists in K-8 schools in South Carolina.

The primary question that the SCDE was interested in was: "Do various factors, particularly financial, of school library media centers (SLMC's) positively affect student scores on the Palmetto Achievement Challenge Test (PACT) tests?

The PACT standardized battery of tests is a mandatory testing program of all students in grades 3 through 8, in all public schools in South Carolina. The PACT was one of the first in the nation to link student achievement with an overall rating of schools, and individual teacher performance. By 2005, all of the above mentioned students were required to annually take PACT tests in four subject areas: English Language Arts (ELA); Mathematics; Social Studies; and Science. Students receive a numerical score in each subject area of the PACT test, which is then translated into one of four categories: below basic; basic; proficient; advanced. For purposes of rating schools, the PACT

scores are broken into two primary categories: percentage of students scoring "below basic" (the same percentage as the student category of the same title); and the percentage of students that "meets standard" (the sum of the next three student categories).

Hypothesis:

There are two sets of hypotheses in this analysis; each set contains an H_0 or null hypothesis (there is no statistically significant relationship between the variables) and an H_n or research hypothesis (there is a statistically significant relationship between the variables):

Elementary Schools:

H_0: There is no statistically significant positive relationship (at $P \leq .05$) between the per pupil funding of school library media centers in South Carolina public elementary schools, and the percentage of "meet standards" standardized student test scores in those schools;

H_1: There is a statistically significant positive relationship (at $P \leq .05$) between the per pupil funding of school library media centers in South Carolina public elementary schools, and the percentage of "meet standards" standardized student test scores in those schools.

Middle Schools:

H_0: There is no statistically significant positive relationship (at $P \leq .05$) between the per pupil funding of school library media centers in South Carolina public middle schools, and the percentage of "meet standards" standardized student test scores in those schools.

H_2: There is a statistically significant positive relationship (at $P \leq .05$) between the per pupil funding of school library media centers in South Carolina public middle schools, and the percentage of "meet standards" standardized student test scores in those schools.

Definitions:

For purposes of this study, a public elementary school is defined as any South Carolina school funded primarily with public funds that annually administers the PACT to grades 3 through 5. Thereby, the study includes the more common K-5 variety of elementary school, but also includes schools do not follow that pattern; for example, schools that include K-6 or K-8 grades. The study does not include, as usable data elements, schools which did not test all three grades. For example, the study does not include new elementary schools which were "ramping up," that is, schools which were initially including only classes in a limited number of grades as they gradually expanded to a full array of grades.

A public middle school is defined as any South Carolina school funded primarily with public funds that annually administers the PACT to grades 6 through 8. Thereby, the study includes the more common 6-8 variety of middle school, but also includes schools do not follow that pattern; for example, schools that include K-8 or 6-12 grades. The study does not include, as usable data elements, schools which did not test all three grades. For example, the study does not include 6th grade only schools.

2.0 Literature Review

With the publication in 1983 of "A Nation at Risk," the national consciousness became aware that the nation's schools were not providing satisfactory levels of education (National Commission, 1983). The national governors' Association began to work on accountability and achievement standards. By 1992, the National Council on Education Standards and Testing was promoting the adoption of state standards. "Goals 2000" was written into federal law requiring states to develop plans to achieve goals derived from the federal standard with assessments to show progress (U.S. National Council, 1992). The South Carolina General Assembly directed the state Department of Education, by 1995, to have prepared a plan to comply with "Goals 2000." In 1998, South Carolina passed the Education Accountability Act, enabling the Governor to establish the Education Oversight Committee with the power to implement assessments of progress toward statewide standards (Hawkins, 2001). The first PACT tests were administered to children in grades three through eight in April, 1999.

The "Colorado Studies" or "Lance Studies"

In 1993, the first of many studies by Keith Curry Lance, et al., was conducted in Colorado (Lance, Welborn, & Hamilton-Pennell, 1993). This became known as the "Colorado Study" and was replicated in Alaska (Lance, Hamilton-Pennell, & Rodney, 1999), again in Colorado (Lance, Rodney, & Hamilton-Pennell, 2000a), Pennsylvania (Lance, Rodney, & Hamilton-Pennell, 2000b), Oregon (Lance, Rodney, & Hamilton-Pennell, 2001), New Mexico (Lance, Rodney, & Hamilton-Pennell, 2002), Iowa

(Rodney, Lance, & Hamilton-Pennell, 2002), Michigan (Rodney, Lance, & Hamilton-Pennell, 2003), and Illinois (Lance, Rodney, & Hamilton-Pennell, 2005). Collectively, these reports are also sometimes referred to as the "Lance Studies." These studies attempt to correlate spending on school libraries with standardized testing scores. The original Colorado study concludes that "schools with better-funded library media centers tend to achieve higher average reading scores, whether their schools and communities are rich or poor and whether adults in their community are well or poorly educated"; "the size of the library media center's total staff and the size and variety of its collection are important characteristics of library media programs that intervene between library media center expenditures and test performance"; and students whose library media specialists performed an instructional role tended to achieve higher average test scores (Lance, Wellborn, & Hamilton-Pennell, 1993).

These studies state that greater staffing of school libraries, a well developed library instruction and collaboration program, larger collection size, access to information technology, and greater school library spending positively impact standardized test scores. Noted in all the studies in this group is the importance of school library program development. While funding is not listed as a major influence, it is included in lists of influential factors, and when one considers the recommendations regarding increased staffing, information technology and larger collections, funding must be a consideration because these improvements do require additional money.

Other state studies using similar methodologies

Texas School Libraries demonstrated higher Texas Assessment of Academic Skills (TAAS) performance at all educational levels in schools with librarians than in school without librarians, and showed that socio-economic variables such as the percentage of white students, Hispanic students, and economically disadvantaged students explain most of the variance in TAAS performance at all educational levels (Smith, 2001). *School Libraries and MCAS Scores* (Massachusetts) listed six or seven variables at each school level. "Expenditures per pupil" was included in both the elementary and middle school lists in addition to hours of service, aspects of the collection, library instruction, and staffing (Baughman, 2002).

In *Making the Grade*, Baumbach (2003) examines school libraries in Florida and lists factors present in the highest achieving elementary schools including media specialist teaching and collaborations activities, websites and links to information resources, large book and periodical collections, and information skills curricula. In a Minnesota study, Baxter and Smalley (2003) determined that schools with above average scores on reading tests were twice as likely to have a media specialist working full-time. Also, higher library budgets for books and electronic materials were found to positively impact students' reading achievement . A North Carolina study, *An Essential Connection* also linked increases in library spending to increases on standardized reading and English tests (Burgin & Bracy, 2003).

3.0 Methodology

1. The initial data collection was conducted by the SCDE using an electronic survey sent to the school library media specialist of record in all public schools in South Carolina from May through September 2005. The respondents replied using a login-based secure server, and each school was identified by a unique number and name. The questionnaire (See Appendix), covered a wide range of factual questions concerning the services offered by the school library. Many of the questions go beyond the focus of this particular analysis, and included questions such as the use of satellite-transmitted programming sponsored by the SCDE;
2. The initial data set of responses was augmented in several iterations of "builds" or additions to the data set that included:
    a. Appending the PACT scores for each responding school (by matching school code and name) from a downloadable data set provided by the SCDE (2005);
    b. Appending student demographics for each responding school (by matching school code and name) from an electronic data set provided directly from the SCDE;
    c. Manually appending school funding information derived from the *South Carolina Statistical Abstract, 2005*;

d. Manually appending county-level economic indicators from U.S. Census data.

3. The master combined data set was then analyzed using the statistical package SPSS for both descriptive statistical profiling and inferential statistical hypothesis testing. Particular attention was paid to ensuring that the sample of schools responding to the questionnaire adequately reflected known population parameters of all schools in South Carolina.

Assumptions and Limitations:

1. As with all questionnaire research, this study assumes that the respondents understood the questions they were being asked and responded in a truthful manner. The reliability of this particular instrument is enhanced in two ways:

   a. The school library media specialists were being asked to respond to the agency (the SCDE) that provides partial funding for their school and that is legally mandated to coordinate and evaluate public schools activities in the state, and;

   b. The primary questions from the questionnaire used for analysis in this study were factually-based (i.e., objective-based questions rather than subjective-based questions);

2. Since the design of the initial questionnaire was predicated on the concept of questionnaire completion by the current school library media specialist in each school, there is the possibility of under-representation in the sample of schools for which there is no school library media specialist employed. This instance of this

under-representation is mitigated by the SCDE requirement for school library media specialists in all public schools in the state, and a similar requirement by the regional accrediting association for South Carolina schools (i.e., the Southern Association of College and Schools (2005);

3. The assumption is made that, during the data set building process, that the correct information was attributed to appropriate corresponding school. While this is always a potential hazard, the use of unique school identifiers both by number and name reduced this possibility;
4. The study assumes that the most current demographic data from the U.S. Census Bureau and from the state of South Carolina provides an adequate approximation of current trendlines. Without doubt, much of the demographic data will have shifted slightly from year-to-year, but the overall pattern should be reliable;
5. The aspect of researcher bias is a consideration in any study. While the SLIS is particularly well-known for SLM instruction, neither of the authors have school library media as a specialty. In addition, the authors who conducted this analysis did not receive financial remuneration either through grant or direct payment from either the SCDE, or any other professional group, for conducting this analysis;
6. A limitation of this study is that all data is at the school level, rather than at the student level. This by necessity implies that, for a particular data element, one is looking at the average for that particular school, and that any implication for a given student in a school in the sample is at least once removed. Therefore, the authors have made every effort to only draw implications at the school level;

7. The results of this analysis are applicable only to elementary schools and middle schools in the state of South Carolina. The study does not attempt to generalize the results to a geographic region or to the nation as a whole.

4.0 Descriptive Analysis

4.1 General Data Set Characteristics:

The response rate to the initial questionnaire is given in Table 1. The return rate of questionnaires was quite large at ~ 80 percent and in terms of absolute number of returns for both S.C. elementary schools and middle schools both as separate categories, and combined as a single sample. However, the numerical size of a sample or return rate of a questionnaire is only as good as the sample's quantitative reflection of the population it represents. The most important population benchmark that a sample must reflect is the primary dependent variable (in this case, the average PACT student test scores). The results of this benchmark comparison between average PACT student test scores contained in the sample data set and known statewide population average PACT scores is given in Table 2.

The method used to determine the adequacy of the sample to the population was to employ a series of one-sample t-tests comparing the sample mean of each grade and type of student standardized test with the known population mean for that given student test. The lack of significance in this series of t-tests indicates that the sample mean and population mean of each standardize test were statistically equivalent ($P \leq .05$). In other words, the sample is a reasonably good reflection of the population from which it was drawn.

Table 1

S.C. SLM
Survey Return Rate*

School Type	Population N=	Sample Return N=	Return Rate Percentage
Elementary	**532**	**416**	**78.2**
Middle	**216**	**178**	**82.4**
TOTAL:	**748**	**594**	**79.4**

***** There were 19 schools that administered PACT scores to grades 3-8, thereby meeting the definition of both an elementary school and a middle school. These 19 were counted as usable returns in both categories.

Table 2

Sample – Population Benchmark Test
Percentage of Students "Meeting Standard"

PACT Test Category	Population Mean = *	N=	Sample Mean=	N=	One-Sample t – test =	Significance P ≤ .05
3rd Grade: English/LA	86.52	532	86.56	416	.084	Not sign.
3rd Grade: Mathematics	82.23	532	82.11	416	- .221	Not sign.
3rd Grade: Science	62.58	532	62.68	416	.125	Not sign.
3rd Grade: Social Studies	77.97		78.29	416	.416	Not sign.
4th Grade: English/LA	78.80	532	78.79	416	- .027	Not sign.
4th Grade: Mathematics	77.69	532	77.65	416	- .068	Not sign.
4th Grade: Science	60.19	532	60.27	416	.087	Not sign.
4th Grade: Social Studies	75.89	532	76.09	416	.294	Not sign.
5th Grade: English/LA	76.03	532	75.91	416	- .201	Not sign.
5th Grade: Mathematics	76.48	532	76.40	416	- .122	Not sign.
5th Grade: Science	54.55	532	54.91	416	.384	Not sign.
5th Grade: Social Studies	61.79	532	61.89	416	.115	Not sign.
6th Grade: English/LA	61.35	216	60.73	178	- .641	Not sign.
6th Grade: Mathematics	77.42	216	77.57	178	.180	Not sign.
6th Grade: Science	54.27	216	53.37	178	- .853	Not sign.
6th Grade: Social Studies	62.68	216	61.70	178	- .852	Not sign.
7th Grade: English/LA	70.66	216	70.72	178	.068	Not sign.
7th Grade: Mathematics	70.73	216	71.14	178	.399	Not sign.
7th Grade: Science	60.01	216	60.41	178	.354	Not sign.
7th Grade: Social Studies	56.50	216	56.80	178	.255	Not sign.
8th Grade: English/LA	74.11	216	73.78	178	- .386	Not sign.
8th Grade: Mathematics	65.61	216	66.14	178	.493	Not sign.
8th Grade: Science	58.12	216	58.51	178	.335	Not sign.
8th Grade: Social Studies	64.71	216	64.55	178	- .128	Not sign.

*Population mean equals the average of the average percentage "meeting standard" in S.C. public schools.
SOURCE: South Carolina Department of Education (2005).

4.2 State Socio-Economic Indicators:

A number of researchers have suggested that important determinants of standardized test scores are economic indicators, and to a lesser extent, ethnicity (e.g., Smith, 2001; Lance, Rodney, & Hamilton-Pennell, 2000). Table 3 lists the comparative data for selected socio-economic indicators for South Carolina and the United States respectively. Generally the indicators illustrate that South Carolina is slightly less educated in terms of the level of the adult population that has a high school diploma, or equivalent, and in terms of the percentage of the adult population that has earned at least a baccalaureate degree. The indicators also demonstrate that South Carolina is a relatively poor state in terms of the percentage of households below the poverty line and median household income (ranked thirty-ninth out of fifty states). The remaining indicator shows that South Carolina has a higher percentage of the population that identify themselves as an ethnic minority than the median level for the United States in the year 2000. One conclusion that can be reached from this analysis is the cyclical logic of: relatively low educational attainment of the citizens of South Carolina is related to the lower than average median household income, which in turn, creates lower educational attainment expectations.

Table 3

Selected South Carolina Socio-Economic Indicators

Indicator	South Carolina	United States Average
High School Graduates in % [1]	83.6	85.2
College Graduates in % [2]	24.9	27.7
Households Below the Poverty Level in % [3]	14.0	9.8
Median Household Income [4]	$37,442	$44,473
Ethnicity in %: [5]		
White	67.2	75.1
African American	29.5	12.3
Hispanic	2.4	12.5
Other	0.9	0.1

[1] Census Bureau (2006).
[2] Ibid.
[3] Census Bureau (2002).
[4] Ibid.
[5] Census Bureau (2000).

4.3 **School and School Library Demographics**:

A snapshot of the relative population demographics of South Carolina schools and school libraries is given in Table 4. One should note that, while it is the most recent information available, the comparative national/South Carolina data presented in Table 4 is somewhat dated, representing AY 1999-2000. In 2000, South Carolina had the sixth highest percentage of paid full-time school library media specialists (SLMS) among all states in the nation. In comparable fashion, in the same year South Carolina ranked fifth out of the fifty states in the percentage of SLMS that have the Master of Library Science or related degree. These favorable relationships concerning the number and educational attainment of SLMS are mitigated by the knowledge that South Carolina ranks twenty-first out of fifty states in average annual school library expenditures. One conclusion that could be reached from this quantitative profile is that South Carolina places a relatively high value on the presence and education of SLMS in the state, but puts a relatively low value on the institutional support necessary for them to adequately perform their duties.

Table 4

Selected School and School Library Demographics (2000)

Indicator	South Carolina	United States Average
K-12 Student Enrollment [1]	767,586	NA
Public Schools With Paid Certified Full-time SLMS in % [2]	91.0	60.5
Public Schools Where SLMS Has MLS or related degree in % [3]	65.5	41.6
Average Public School Library Expenditures [4]	$8,281	$8,729

[1] South Carolina Budget and Control Board (2000).
[2] U.S. National Center for Education Statistics (2004).
[3] Ibid.
[4] Ibid.

4.4 **Descriptive Profile of Sampled S.C. Schools (AY2005):**

A quantitative profile of the sample in provided in Table 5. The schools responding to the SLM survey represented ~350,000 students enrolled in S.C. K-12 public schools. It is interesting to note that the median household income for the areas served by the sampled schools is comparable to the median household income for the population of S.C. (i.e., elementary schools: $t = 0.506$, d.f. = 415, not significant; middle schools: $t = -0.531$, d.f. = 177, not significant), but the relatively high average level of students qualifying for the free or assisted lunch program would indicate economic stress among the families of these students. One explanation for this seeming contradiction is that while the average median household income of the areas served by the schools in the sample is statistically equivalent to the same measure for the state population, the average median household income for the state population is low enough to qualify most families for one form of subsidized lunch program.

However, the sampled schools (and perhaps schools in general) are not a perfect reflection of the socio-economic structure in which they function. For example, it would appear that the sampled schools are more pluralistic as compared to ethnicity of the state population (i.e., elementary schools: $t = 12.188$, d.f. = 415, $P \leq .01$; middle schools: $t = 7.852$, d.f. = 177, $P \leq .01$). This could indeed reflect the probability of a true difference between the sample schools and the general population; or, alternatively, since the population data is five years older than the sample school data, the difference could reflect a shift in the demographic proportions of ethnicity within the state.

Table 5

Sampled S.C. Elementary and Middle Schools
Selected Demographic Profile*

Indicator	Elementary Schools	Stand. Dev.	Middle Schools	Stand. Dev.
N =	416		178	
Total School Student Enrollment	226,980		120,274	
Average School Student Enrollment	545.63	239.13	675.70	269.89
Average School Expenditures Per Student	$7,508.26	$774.87	$7,462.43	$768.36
Students Receiving Subsidized Lunch in %	60.59	22.34	57.28	20.10
Ethnicity in %: [1]				
Non-White:	49.52	27.97	48.01	25.84
White:	50.48	27.97	51.99	25.84
Median Household Income [2]	$37,559.95	$4,751.62	$37,247.10	$4901.07
Households Below the Poverty Level in % [3]	11.44	5.44	11.87	5.96
High School Graduates in % [4]	76.61	6.07	76.23	6.42

*NOTE: Unless otherwise referenced, school-level data provided by the SCDE.

1 Ethnicity is self-reported. Non-White includes: African American, Hispanic or Latino origin, Asian American, Native American, and other government recognized ethnic groups.
2 U.S. Census Bureau (2002).
3 Ibid.
4 South Carolina Budget and Control Board (2000).

4.5 Descriptive Profile of Sample SLM

A descriptive profile of S.C. public school library media centers is provided in Table 6. The data would indicate that the demographics between SLM centers in elementary schools and middle schools are remarkably similar in terms of collection size, age of collection, and years of experience for the SLMS. The only statistically significant difference between the sample of elementary school SLM centers and middle school SLM centers was in the area of average SLM center annual budgets. However, the subsequent statistic of per pupil SLM center spending was found to be statistically equivalent between the two samples. The answer to this seeming inconsistency lies in the average size of school by student population. The data in Table 5 indicated that the average student enrollment in the middle school sample was ~ 125 students larger than the average student enrollment size in elementary schools. Thereby, if the average per pupil spending in the two types of schools is essentially the same, but the typical middle school has a higher enrollment than the typical elementary school, it follows that the typical middle school SLM center budget will be larger than the typical elementary school SLM center budget.

Table 6

Selected Descriptive SLM Demographics

Sample S.C. Elementary and Middle Schools

Indicator	Elementary Schools	Stand. Dev.	Middle Schools	Stand. Dev.	Between Sample t – test =
N =	416		178		d.f. = 592
Average SLM Budget *	$6,560.16	$4,537.65	$7,995.92	$4,811.49	- 3.469 [b]
Average SLM Budget Per Pupil *	$12.59	$7.32	$12.32	$6.82	0.432
Average SLMS Years Of Experience	14.02	9.65	15.02	10.06	- 1.531
Average Print Collection Size	11367.20	4929.00	11578.16	4718.66	-0.483
Average Age of Books	16.14	4.86	16.56	6.02	-0.902

* Does not include one-time monies such as grants.

[a] Significant at P ≤ 05.
[b] Significant at P ≤ 01.

5.0 Inferential Analysis

5.1 Pearson Product Moment Correlation (Pearson r)

A linear Pearson r correlation matrix was constructed containing the percentage of students "meeting standards" in each of the PACT subject tests for each grade and the per pupil materials spending on SLM centers for each school, in both the elementary school sample and in the middle school sample. Since there are a total of thirteen variables in each sample correlation matrix (i.e., the per pupil SLM materials spending, plus three grades with four PACT tests per grade), the subsequent output produces a somewhat unwieldy three page by two page output. While not precisely the same product as the large matrix, Tables 7 - 9 illustrates the correlation matrix for the elementary school sample by grade, and Tables 10 – 12 produces the same correlation matrix by grade for the middle school sample.

The correlation matrix for each sample yields nearly identical results that can be summed in two overall results:

1. The data would indicate that there is a statistically significant relationship ($P \leq .01$) between the PACT scores of the various subjects in each grade. Interestingly, the same statistically significant

relationship exists between all PACT scores in all tested grades regardless of subject in each sample. In other words, all the PACT scores in elementary schools had a strong positive statistical relationship, and all the PACT scores in middle schools also had a strong positive statistical relationship. This result would lead one to the conclusion that elementary schools or middle schools that have high PACT scores in one subject of one grade will tend to have high PACT scores in all subjects of all tested grades. The converse relationship would also be indicated, elementary or middle schools that have low PACT scores in one subject of one grade will tend to have low PACT scores in all subjects of all tested grades;

2. More importantly in terms of this study, a statistically significant relationship **does not exist** between the materials budget of SLM centers and the PACT score outcome in any subject regardless of subject or grade. This lack of a relationship is true for both the elementary school sample, and the middle school sample. Given this result, the null hypothesis for each sample must be accepted, and the research hypotheses (i.e., H_1 and H_2) must be rejected .

Table 7

Pearson r Correlation Coefficient Results of SLM Expenditures per Student and 3rd Grade PACT Scores in Elementary Schools

		Materials Expenditures per Student	3rd Grade English / LA Meeting Std.	3rd Grade Math Meeting Std.	3rd Grade Science Meeting Std.	3rd Grade Social Studies Meeting Std.
Materials Expenditures per Student	Pearson Correlation	1	-.013	-.053	-.031	-.030
	Sig. (2-tailed)		.794	.282	.532	.537
	N	416	416	416	416	416
3rd Grade English / LA Meeting Std.	Pearson Correlation	-.013	1	.790(**)	.740(**)	.712(**)
	Sig. (2-tailed)	.794		.000	.000	.000
	N	416	416	416	416	416
3rd Grade Math Meeting Std.	Pearson Correlation	-.053	.790(**)	1	.815(**)	.789(**)
	Sig. (2-tailed)	.282	.000		.000	.000
	N	416	416	416	416	416
3rd Grade Science Meeting Std.	Pearson Correlation	-.031	.740(**)	.815(**)	1	.825(**)
	Sig. (2-tailed)	.532	.000	.000		.000
	N	416	416	416	416	416
3rd Grade Social Studies Meeting Std.	Pearson Correlation	-.030	.712(**)	.789(**)	.825(**)	1
	Sig. (2-tailed)	.537	.000	.000	.000	
	N	416	416	416	416	416

** Correlation is significant at the 0.01 level (2-tailed).

Table 8

Pearson r Correlation Coefficient Results of SLM Expenditures per Student and 4th Grade PACT Scores in Elementary Schools

		Materials Expenditures per Student	4th Grade English / LA Meeting Std.	4th Grade Math Meeting Std.	4th Grade Science Meeting Std.	4th Grade Social Studies Meeting Std.
Materials Expenditures per Student	Pearson Correlation	1	.048	.039	-.022	-.016
	Sig. (2-tailed)		.325	.425	.654	.746
	N	416	416	416	416	416
4th Grade English / LA Meeting Std.	Pearson Correlation	.048	1	.827(**)	.819(**)	.846(**)
	Sig. (2-tailed)	.325		.000	.000	.000
	N	416	416	416	416	416
4th Grade Math Meeting Std.	Pearson Correlation	.039	.827(**)	1	.833(**)	.803(**)
	Sig. (2-tailed)	.425	.000		.000	.000
	N	416	416	416	416	416
4th Grade Science Meeting Std.	Pearson Correlation	-.022	.819(**)	.833(**)	1	.870(**)
	Sig. (2-tailed)	.654	.000	.000		.000
	N	416	416	416	416	416
4th Grade Social Studies Meeting Std.	Pearson Correlation	-.016	.846(**)	.803(**)	.870(**)	1
	Sig. (2-tailed)	.746	.000	.000	.000	
	N	416	416	416	416	416

** Correlation is significant at the 0.01 level (2-tailed).

Table 9

Pearson r Correlation Coefficient Results of SLM Expenditures per Student and 5th Grade PACT Scores in Elementary Schools

		Materials Expenditures per Student	5th Grade English / LA Meeting Std.	5th Grade Math Meeting Std.	5th Grade Science Meeting Std.	5th Grade Social Studies Meeting Std.
Materials Expenditures per Student	Pearson Correlation	1	.038	.013	-.002	-.026
	Sig. (2-tailed)		.437	.798	.967	.594
	N	416	416	416	416	416
5th Grade English / LA Meeting Std.	Pearson Correlation	.038	1	.829(**)	.835(**)	.826(**)
	Sig. (2-tailed)	.437		.000	.000	.000
	N	416	416	416	416	416
5th Grade Math Meeting Std.	Pearson Correlation	.013	.829(**)	1	.806(**)	.765(**)
	Sig. (2-tailed)	.798	.000		.000	.000
	N	416	416	416	416	416
5th Grade Science Meeting Std.	Pearson Correlation	-.002	.835(**)	.806(**)	1	.867(**)
	Sig. (2-tailed)	.967	.000	.000		.000
	N	416	416	416	416	416
5th Grade Social Studies Meeting Std.	Pearson Correlation	-.026	.826(**)	.765(**)	.867(**)	1
	Sig. (2-tailed)	.594	.000	.000	.000	
	N	416	416	416	416	416

** Correlation is significant at the 0.01 level (2-tailed).

Table 10

Pearson r Correlation Coefficient Results of SLM Expenditures per Student and 6th Grade PACT Scores in Middle Schools

		Materials Expenditures per Student	6th Grade English / LA Meeting Std.	6th Grade Math Meeting Std.	6th Grade Science Meeting Std.	6th Grade Social Studies Meeting Std.
Materials Expenditures per Student	Pearson Correlation	1	.010	-.024	-.003	.003
	Sig. (2-tailed)		.896	.752	.971	.973
	N	178	178	178	178	178
6th Grade English / LA Meeting Std.	Pearson Correlation	.010	1	.825(**)	.893(**)	.835(**)
	Sig. (2-tailed)	.896		.000	.000	.000
	N	178	178	178	178	178
6th Grade Math Meeting Std.	Pearson Correlation	-.024	.825(**)	1	.827(**)	.746(**)
	Sig. (2-tailed)	.752	.000		.000	.000
	N	178	178	178	178	178
6th Grade Science Meeting Std.	Pearson Correlation	-.003	.893(**)	.827(**)	1	.842(**)
	Sig. (2-tailed)	.971	.000	.000		.000
	N	178	178	178	178	178
6th Grade Social Studies Meeting Std.	Pearson Correlation	.003	.835(**)	.746(**)	.842(**)	1
	Sig. (2-tailed)	.973	.000	.000	.000	
	N	178	178	178	178	178

** Correlation is significant at the 0.01 level (2-tailed).

Table 11

Pearson r Correlation Coefficient Results of SLM Expenditures per Student and 7th Grade PACT Scores in Middle Schools

		Materials Expenditures per Student	7th Grade English / LA Meeting Std.	7th Grade Math Meeting Std.	7th Grade Science Meeting Std.	7th Grade Social Studies Meeting Std.
Materials Expenditures per Student	Pearson Correlation	1	-.009	.028	-.001	.055
	Sig. (2-tailed)		.903	.707	.995	.470
	N	178	178	178	178	178
7th Grade English / LA Meeting Std.	Pearson Correlation	-.009	1	.843(**)	.876(**)	.853(**)
	Sig. (2-tailed)	.903		.000	.000	.000
	N	178	178	178	178	178
7th Grade Math Meeting Std.	Pearson Correlation	.028	.843(**)	1	.840(**)	.780(**)
	Sig. (2-tailed)	.707	.000		.000	.000
	N	178	178	178	178	178
7th Grade Science Meeting Std.	Pearson Correlation	-.001	.876(**)	.840(**)	1	.915(**)
	Sig. (2-tailed)	.995	.000	.000		.000
	N	178	178	178	178	178
7th Grade Social Studies Meeting Std.	Pearson Correlation	.055	.853(**)	.780(**)	.915(**)	1
	Sig. (2-tailed)	.470	.000	.000	.000	
	N	178	178	178	178	178

** Correlation is significant at the 0.01 level (2-tailed).

Table 12

Pearson r Correlation Coefficient Results of SLM Expenditures per Student and 8th Grade PACT Scores in Middle Schools

		Materials Expenditures per Student	8th Grade English / LA Meeting Std.	8th Grade Math Meeting Std.	8th Grade Science Meeting Std.	8th Grade Social Studies Meeting Std.
Materials Expenditures per Student	Pearson Correlation	1	.019	.036	.028	.017
	Sig. (2-tailed)		.804	.634	.710	.822
	N	178	177	177	177	177
8th Grade English / LA Meeting Std.	Pearson Correlation	.019	1	.851(**)	.865(**)	.827(**)
	Sig. (2-tailed)	.804		.000	.000	.000
	N	177	177	177	177	177
8th Grade Math Meeting Std.	Pearson Correlation	.036	.851(**)	1	.810(**)	.761(**)
	Sig. (2-tailed)	.634	.000		.000	.000
	N	177	177	177	177	177
8th Grade Science Meeting Std.	Pearson Correlation	.028	.865(**)	.810(**)	1	.912(**)
	Sig. (2-tailed)	.710	.000	.000		.000
	N	177	177	177	177	177
8th Grade Social Studies Meeting Std.	Pearson Correlation	.017	.827(**)	.761(**)	.912(**)	1
	Sig. (2-tailed)	.822	.000	.000	.000	
	N	177	177	177	177	177

** Correlation is significant at the 0.01 level (2-tailed).

5.2 Factor Analysis:

Typically an analysis of this type would end at this point. That is, the hypotheses have been tested and results found. However, the "Colorado" type studies often do not directly test the two main variables (SLM center spending per student and some measure of standardized testing), or directly state hypothesis(es). Oddly, the "Colorado" methodology focuses on the question via a more oblique methodological pattern. The "Colorado" studies seek to determine the nature of the general variables that might drive standardized test scores via several analysis of variance techniques. In an effort to make this study comparable in this respect to the "Colorado studies" a similar set of analyses will be conducted.

One method used by several of the "Colorado studies" is a technique called factor analysis. The function of factor analysis is to take a group of variables with similar statistical dynamics and give them a common identity. That is, from a group of like variables, one collective variable can be created. The reason for conducting factor analysis is that it allows for more straight-forward subsequent analysis utilizing fewer variables. **It is important to understand that factor analysis is an exploratory tool rather than an end product.** Typically, within a group of variables to be factored one looks for a relatively large sample size (factor analysis is a sample intensive process), strong correlation between variables in the group (although correlations of $r \leq .9$ should

probably be avoided), and a high level of communalities generated by the variables examined.

For example, as was discovered earlier in this study, working with twelve standardized testing variables in each of the two samples is somewhat tedious. Since this group of variables share many characteristics, conducting a factor analysis can determine whether these twelve can be reduced to a small number of composite variables. The results of the factor loading for the elementary school sample are given in Table 13. The results of the factors loaded show each variable had a loading score of .8 or higher (.7 or higher is acceptable). Each variable also had a strong correlation with the other variables in the group, and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .942 (the closer to 1.00 this statistic is the better). The initial Eigenvalue was 8.942 explaining 74.51 percent of the variance. The result is that this is a good candidate for factoring and will be labeled Elementary School PACT Testing factor.

A similar analysis was conducted for testing variables in middle schools. The results of the factor loading for the middle school sample are given in Table 13, and are comparable to those for the elementary schools sample. The results of the factors loaded show each variable had a loading score of .8 or higher (.7 or higher is acceptable). Each variable also had a strong correlation with the other variables in the group, and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .940. The initial Eigenvalue was 9.668 explaining 80.56 percent of the variance. The result is that this is a good candidate for factoring and will be labeled Middle School PACT Testing factor.

A factor analysis was also conducted for socio-economic variables (e.g., percent of the adult population in the district that had not finished high school; the median household income; percent of minority students; percent of the adult population below the poverty line; percent of student receiving subsidized lunch) for each sample. The results of KMO statistic for various trials of factoring for this group yielded a score of .569 for the elementary school sample, and .563 for the middle school sample. Various iterations of these variables did not substantially improve the KMO results for either. Since scores of ~ .500 for the KMO makes the factor analysis of questionable validity, the factor analysis for either sample was not continued for this group of variables.

A factor analysis conducted on a group of SLM center variables (e.g., materials budget per student; print collection per student; SLMS years of experience; average age of books in the collection) yielded the same unsatisfactory conclusion as the socio-economic variables group. The results of the KMO statistic for the SLM center variables in the elementary schools sample was .468, and .490 for middle schools. Again, various iterations of these variables did not substantially improve the KMO results for either sample, and the factoring attempt was halted.

Table 13

Factor Analysis
Elementary School PACT Scores
Component Matrix

	Component
3rd Grade English / LA Meeting Std	.814
3rd Grade Math Meeting Std.	.844
3rd Grade Science Meeting Std	.885
3rd Grade Social Studies Meeting Std.	.810
4th Grade English / LA Meeting Std.	.859
4th Grade Math Meeting Std.	.859
4th Grade Science Meeting Std.	.918
4th Grade Social Studies Meeting Std.	.870
5th Grade English / LA Meeting Std.	.876
5th Grade Math Meeting Std.	.843
5th Grade Science Meeting Std.	.890
5th Grade Social Studies Meeting Std	.884

Extraction Method: Principal Component Analysis.

Table 14

Factor Analysis
Middle School PACT Scores
Component Matrix

	Component
6th Grade English / LA Meeting Std.	.917
6th Grade Math Meeting Std.	.869
6th Grade Science Meeting Std.	.921
6th Grade Social Studies Meeting Std.	.865
7th Grade English / LA Meeting Std.	.899
7th Grade Math Meeting Std.	.892
7th Grade Science Meeting Std.	.931
7th Grade Social Studies Meeting Std.	.912
8th Grade English / LA Meeting Std.	.905
8th Grade Math Meeting Std.	.854
8th Grade Science Meeting Std.	.911
8th Grade Social Studies Meeting Std.	.891

Extraction Method: Principal Component Analysis.

5.4 Coefficient of Determination: R^2 Analysis:

R^2 is closely related to the Pearson r correlation statistic (mathematically the square of it), but is a much stronger statistic in terms of the information it yields. R^2 measures the amount variance of one variable as explained by another variable(s). It produces a statistic measured from 0.00 to 1.00 (which makes conversion to percentages quite simple). In the situation of multiple regression, the combined R^2 measures the combined amount of variation of the dependent variable explained by a selected group of independent variables.

The "Colorado Studies" rightly make extensive use of the R^2 statistic. In the various studies that have made use of this methodology, the amount of total variance of the standardized test score dependent variable explained by a variety of SLM center independent variables varies between 2 and 8 percent (i.e., R^2 = .02 to .08) after controlling for other variables. Typically, the studies based on the methodology of the "Colorado Study" will use a socio-economic factor of variables and a library-related factor of variables as the independent variables, measuring the variance of a single standardized test score dependent variable (note: not factored since there is normally only one test score variable in these studies). This is mentioned because the manner in which multiple regression is calculated (and there is a substantial variety of methods) will partially determine the end result.

For purposes of this study, two approaches to multiple regression will be utilized. The first is a direct approach of using the Elementary School PACT Testing factor as the dependent variable, and various measures of SLM centers as independent variables (i.e., the level of SLM materials spending per pupil; the size of the SLM center print collection per pupil; the number of years of experience of the SLMS; the average age of books in the print collection). Specifically a backward stepwise regression pattern was followed to conduct the analysis. A backward stepwise regression method starts by using all the independent variables given and systematically eliminates a variable at each step while retaining those variables that explain the greatest degree of dependent variable variance. Essentially this allows the researcher to determine the model that yields the largest R^2 value while simultaneously using the fewest number of independent variables. The results of this analysis are given in Table 15.

The adjusted R^2 for these models does not vary much from a model using all the SLM center variables to using just one variable (from $R^2 = .046$ using all the variables to $R^2 = .041$ using just one variable). This relative small degree of change in the amount of variance explained by each subsequent iteration is reflected in the lack of statistical significance in the accompanying F statistic for each model. The SLM center variable that accounts for the greatest degree of variance in the Elementary School PACT Testing factor is the size of the SLM print collection per student at 4.1 percent of the total variance.

A similar result is found when switching to the middle school sample. The results of using the Middle School PACT Testing factor as the dependent variable with the same SLM center independent variables is given in Table 16. The adjusted R^2 varies about 1 percentage point from $R^2 = .044$ using all the SLM center variables to $R^2 = .055$ using just the best single variable. Again, the SLM center variable that accounts for the greatest degree of variance in the Middle School PACT Testing factor is the size of the SLM print collection per student. Normally it would be counter-intuitive to have the R^2 value actually decrease as one adds variables to the model, but the relative values of R^2 are so small that this is not completely surprising.

With the results of these two multiple regression analyses one could argue that the data from SLM centers in South Carolina is well within the range of results found in the states that have used variations of the methodology of the "Colorado Study." However, there is an important exception. The R^2 results of the studies using the "Colorado Study" methodology are theoretically controlled for other related independent variables; the R^2 results for South Carolina presented thus far are not controlled.

Table 15

Multiple Regression Analysis
Elementary School PACT Scores / SLM Center Variables
Backward Stepwise Regression Method

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.235(a)	.055	.046	.97507505	.055	5.973	4	407	.000
2	.231(b)	.053	.046	.97503449	-.002	.966	1	407	.326
3	.221(c)	.049	.044	.97602368	-.004	1.830	1	408	.177
4	.209(d)	.044	.041	.97755670	-.005	2.289	1	409	.131

a Predictors: (Constant), Print Collection per Student, SLM Specialist Years of Experience, Average Book Age, Materials Budget per Student
b Predictors: (Constant), Print Collection per Student, Average Book Age, Materials Budget per Student
c Predictors: (Constant), Print Collection per Student, Average Book Age
d Predictors: (Constant), Print Collection per Student

Table 16

Multiple Regression Analysis
Middle School PACT Scores / SLM Center Variables
Backward Stepwise Regression Method

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.257(a)	.066	.044	.97924616	.066	3.030	4	171	.019
2	.257(b)	.066	.050	.97645390	.000	.021	1	171	.886
3	.257(c)	.066	.055	.97368918	.000	.022	1	172	.883
4	.245(d)	.060	.055	.97384290	-.006	1.055	1	173	.306

a Predictors: (Constant), Print Collection per Student, SLM Specialist Years of Experience, Average Book Age, Materials Budget per Student
b Predictors: (Constant), Print Collection per Student, Average Book Age, Materials Budget per Student
c Predictors: (Constant), Print Collection per Student, Materials Budget per Student
d Predictors: (Constant), Print Collection per Student

The second approach to determining multiple regression in this study will use a combination of SLM center and selected socio-economic independent variables. The dependent variable will remain the Elementary School PACT Testing factor for the elementary school sample, and the Middle School PACT Testing factor for the middle school sample. A listing of the independent variables includes:

SLM Center Variables:

- SLM annual materials budget per student;
- Size of the SLM print collection per student;
- Years of experience of the SLM specialist;
- Average age of books in the SLM collection.

Socio-Economic Variables:

- School district spending per student;
- Median household income in the county;
- Percentage of families living below the poverty line in the county;
- Percentage of students receiving free or subsidized lunch;
- Percentage of individuals with no high school diploma in the county;
- Percentage of students who are minority students.

Continuing to use a backward stepwise regression technique, the results of the multiple regression for the elementary school sample is given in Table 17. There are several interesting aspects of the R^2 analysis of this sample. First, the best model of independent variables that explain the variance of standardized test scores in elementary schools is made up of four socio-economic variables (i.e., median household income; percentage of individuals with no high school diploma in the county; percentage of students who are minority students; and percentage of students receiving free or subsidized lunch); there are no SLM variables in the model. In other words, the variance that could be attributed to SLM variables was subsumed by socio-economic variables. Second, although two-thirds of the total variance of elementary schools is explained by the best model, the overall R^2 level does not change substantially after dropping six variables out of the mix (i.e., from model one to model seven). This would lead to the conclusion that there was a relative large level of multicolinearity among the variables.

The same approach is used to analyze the multiple regression of SLM and socio-economic independent variables for the middle school sample, but using the Middle School PACT Testing factor as the dependent variable. The results, given in Table 18, are very similar to the elementary school model with the exception that one SLM variable is added to the same four socio-economic variables. The SLM variable of: size of the SLM print collection per student, was part the five independent variable model that explains 78.5 percent of the variation in middle school standardized test scores. Again, it noteworthy that while five variables were dropped during the model building process, the adjusted R^2 score did not substantially improve.

Table 17

Multiple Regression Analysis
Elementary School PACT Scores / SLM Center and Socio-Economic Variables
Backward Stepwise Regression Method

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.821(a)	.674	.666	.57711377	.674	82.904	10	401	.000
2	.821(b)	.674	.667	.57643629	.000	.057	1	401	.812
3	.821(c)	.674	.667	.57582801	.000	.150	1	402	.699
4	.821(d)	.674	.668	.57524239	.000	.179	1	403	.673
5	.821(e)	.673	.669	.57480623	.000	.386	1	404	.535
6	.820(f)	.673	.669	.57469657	-.001	.845	1	405	.358
7	.819(g)	.671	.667	.57586603	-.002	2.658	1	406	.104

a Predictors: (Constant), Print Collection per Student, SLM Specialist Years of Experience, Average Book Age, Materials Budget per Student, Median Household Income, district expenditures per pupil, percentage minority students, Percent of families in poverty, percentage of students receiving subsidized lunch, percentage not graduating from high school.
b Predictors: (Constant),), Print Collection per Student, SLM Specialist Years of Experience, Average Book Age, Materials Budget per Student, Median Household Income, district expenditures per pupil, percentage minority students, percentage of students receiving subsidized lunch, percentage not graduating from high school.
c Predictors: (Constant), SLM Specialist Years of Experience, Average Book Age, Materials Budget per Student, Median Household Income, district expenditures per pupil, percentage minority students, percentage of students receiving subsidized lunch, percentage not graduating from high school.
d Predictors: (Constant), Average Book Age, Materials Budget per Student, Median Household Income, district expenditures per pupil, percentage minority students, percentage of students receiving subsidized lunch, percentage not graduating from high school.
e. Predictors: (Constant), Average Book Age, Materials Budget per Student, Median Household Income, percentage minority students, percentage of students receiving subsidized lunch, percentage not graduating from high school.
f Predictors: (Constant), Materials Budget per Student, Median Household Income, percentage minority students, percentage of students receiving subsidized lunch, percentage not graduating from high school.
g Predictors: (Constant), Median Household Income, percentage minority students, percentage of students receiving subsidized lunch, percentage not graduating from high school.

Table 18

Multiple Regression Analysis
Middle School PACT Scores / SLM Center and Socio-Economic Variables
Backward Stepwise Regression Method

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.893(a)	.797	.785	.46429248	.797	64.958	10	165	.000
2	.893(b)	.797	.786	.46358706	-.001	.496	1	165	.482
3	.892(c)	.797	.787	.46256808	.000	.267	1	166	.606
4	.892(d)	.796	.787	.46201730	-.001	.600	1	167	.440
5	.891(e)	.794	.787	.46246223	-.002	1.326	1	168	.251
6	.890(f)	.791	.785	.46432505	-.003	2.372	1	169	.125

a Predictors: (Constant), Print Collection per Student, SLM Specialist Years of Experience, Average Book Age, Materials Budget per Student, Median Household Income, district expenditures per pupil, percentage minority students, Percent of families in poverty, percentage of students receiving subsidized lunch, percentage not graduating from high school.
b Predictors: (Constant), Print Collection per Student, SLM Specialist Years of Experience, Average Book Age, Median Household Income, district expenditures per pupil, percentage minority students, Percent of families in poverty, percentage of students receiving subsidized lunch, percentage not graduating from high school
c Predictors: (Constant), Print Collection per Student, SLM Specialist Years of Experience, Average Book Age, Median Household Income, percentage minority students, Percent of families in poverty, percentage of students receiving subsidized lunch, percentage not graduating from high school
d Predictors: (Constant), Print Collection per Student, SLM Specialist Years of Experience, Median Household Income, percentage minority students, Percent of families in poverty, percentage of students receiving subsidized lunch, percentage not graduating from high school
e Predictors: (Constant), Print Collection per Student, SLM Specialist Years of Experience, Median Household Income, percentage minority students, percentage of students receiving subsidized lunch, percentage not graduating from high school
f Predictors: (Constant), Print Collection per Student, Median Household Income, percentage minority students, percentage of students receiving subsidized lunch, percentage not graduating from high school

5.5 Quartile Comparison:

The methodology of the "Colorado Studies" also often includes a comparison of the average standardized test scores of the **bottom** quartile of schools by SLM materials spending per student, compared to the average standardized test scores of the **top** quartile of schools by SLM materials spending per student. Uniformly, and not surprisingly, this analysis has produced a significant difference between the average test scores of the two subgroups. While there nothing technically incorrect about utilizing this technique, the authors of this report have several philosophical concerns about the advocacy of conducting this analysis that can be summarized as follows:

a. It is far more typical in research to focus on the middle ground (the interquartile or middle fifty percent of sample values) rather than on the extremes. Using the top and bottom quartiles is bound to pickup and enhance the data outliers at either end of the distribution. These outliers often give an unrealistic view of the sample distribution;
b. The technique has the effect of dividing the sample into two sub-samples of one-fourth the size. In order to keep the structural integrity of normalized data sets, each sub-sample size (i.e., the sample size of each quartile) should contain at least thirty data elements. Even if this sub-sample size guideline is met and depending on the population size in

> question, a researcher using this technique may risk making inappropriate generalizations of a large population based on a relatively small sub-sample.

However, a focus on the top and bottom quartiles is a legitimate tool if one is focusing on "best practices" rather than on a description of a group as a whole; the authors assume this is the rationale of this technique.

For comparison purposes, this study has also run a quartile analysis as described above for the S.C. elementary school sample, and the S.C. Middle school sample. In each sample the data was sorted into the top and bottom quartiles by SLM materials spending per pupil and the corresponding PACT testing factor was compared between the two quartiles. The results of these analyses are that in the case of the S.C. elementary school sample there is no statistically significance ($P \leq .05$) difference in PACT testing scores between the top and bottom quartiles of schools based on SLM materials spending per student (two sample $t = - 0.122$, d.f. = 206). Nor was there a statistically significant ($P \leq .05$) difference in PACT testing scores between the top and bottom quartiles of middle schools based on SLM materials spending per student (two sample $t = - 0.576$, d.f. = 88). Based on previous reported use of this technique, the results of South Carolina schools would appear to be unique in this respect.

6.0 Summary

This study utilized the results of a survey of SLM centers conducted by the SCDE during 2005, when combined with several other data sets, tested the research hypothesis for elementary schools, and for middle schools respectively that there is a statistically significant relationship between the materials budget funding level of SLM centers and the scores of those schools on student standardized PACT test scores. The study first established that the samples constituted a large return both in absolute numbers and in return rate relative to the population of public schools in South Carolina. Next the study established that the standardized student PACT test scores of the samples were a statistically adequate representation of the population of public schools in South Carolina.

To set the background environment, the analysis first reviewed the demographics of the general population in South Carolina. The results of this demographic review were as follows:

- South Carolinians tend to be less educated both in terms of the percentage of the population that are high schools graduates and the percentage of population that have a four-year college degree, than the category averages in the United States;

- South Carolina tends to have a higher percentage of families that live below the poverty line, and a correspondingly lower median household income level than that of the nation as a whole;
- The general population of South Carolina tends to be more pluralistic in terms of ethnicity that the general population of the United States.

This study then moved to a descriptive review of certain demographics of South Carolina elementary and middle schools. The results can be summarized as follows:

- The average median household income for the school districts sampled reflects that of the state as a whole;
- The percentage of children in both the elementary school sample and the middle school sample that qualify for subsidize or free lunch is greater than fifty percent of the student population;
- The schools samples are more ethnically diverse than the general population of South Carolina.

The last area in which the study conducted a descriptive review was for certain demographics of SLM centers in South Carolina. The results were:

- The average percentage of public schools in South Carolina that has a certified SLMS is much higher than the national average;

- The average percentage of public schools in South Carolina that has a certified SLMS that has the Master of Library Science degree or its equivalent in much higher than the national average;
- The funding of SLM centers in South Carolina is much lower than the national average.

A series of inferential statistics were conducted to test the research hypotheses and to explore the nature of the variation of the standardized PACT test scores in the elementary school sample and in the middle school sample. The results of the inferential statistics conducted can be summarized as follows:

- In the sample of South Carolina elementary schools, it was found that there is no statistically significant relationship between the average school scores for students on the PACT standardized tests and the funding of SLM centers when examined using a Pearson r correlation test. Therefore, the research hypothesis H_1 was rejected, and the null hypothesis was accepted;
- In the sample of South Carolina middle schools, it was found that there is no statistically significant relationship between the average school scores for students on the PACT standardized tests and the funding of SLM centers when examined using a Pearson r correlation test. Therefore, the research hypothesis H_2 was rejected, and the null hypothesis was accepted;

- The study determined that the PACT test scores for both samples was amenable to factor analysis, but the SLM variables and the socio-economic variables were determined not to be statistically appropriate for factoring;
- Utilizing multiple regression techniques (R^2) it was found that, when analyzed as a separate entity, SLM variables could account for 4.1 percent and 5.5 percent of the variation of PACT scores factors respectively in the elementary school sample and the middle school sample;
- The data suggests that when school-based variables and socio-economic variables are added to SLM variables in a multiple regression technique in the case of the elementary school sample, there are no SLM variables contained in the best model that explains the most variation of the PACT test score factor with the fewest number of independent variables;
- Last, the data suggests that when school-based variables and socio-economic variables are added to SLM variables in a multiple regression technique in the case of the middle school sample, there is only one SLM variable (i.e., size of print collection per pupil) contained in the best model that explains the most variation of the PACT test score factor with the fewest number of independent variables.

The results of this analysis should not be taken for more than it purports to be: an analysis of the relationship between certain SLM characteristics, particularly materials budget levels, and the PACT scores of elementary and middle schools in South Carolina.

While the data indicates that no statistically significant relationship exists between the funding of SLM centers in South Carolina and the PACT testing in those schools, the conclusion does not follow that SLM centers are without value or do not contribute to the overall quality of the schools in which they are located. The authors professionally believe that SLM centers are a vital component to the educational enterprise of public schools in South Carolina. For example, as SLM centers increasingly integrate their services within the classroom curriculum, the overt measurable outcome of direct SLM center contributions becomes hidden or subsumed within the overall performance of the school as an entity. The value that SLM centers add to schools simply cannot be explained by the metric of budget support in dollars to PACT score results. The value of SLM centers will have to be measured by other methods, and the search for these other metrics would be a profitable area of further research. If the SLM center in a school changes the lives of only a handful of students each year, the modest investment made in SLM centers is well worthwhile.

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Appendix: Library Media Center (LMC) Survey Instrument

[Information queries not relevant to this study are excluded]

1. School Enrollment
2. Grade level (e.g., K-5)
3. Please indicate the number of persons working full and part-time in the LMC
4. Please specify the total number of years of experience as a library media specialist
5. Please specify the total number of years of experience in K-12 education
6. What is the number of days of the library media specialist's contract?
7. What is the number of days of the library media aide's contract?
8. Is the library media aide required to work in other locations in the school?
9. Is there a computerized circulation system and electronic card catalog?
10. Which system is used?
11. Is the electronic card catalog available in other areas of the school?
12. How often is the collection weeded?
13. What is the total number of volumes (books) in the collection?
14. What is the total periodical subscriptions for students (number of titles)?
15. What is the overall average age of the print collection?
16. What is the average age of the print collection for each Dewey classification?
17. Does the library media specialist submit an annual budget request?
18. What was the LMC budget amount (exclusive and federal and special funding) this year?
19. How much federal funding did the library media center receive for this year?
20. How much special funding did the library media center receive for this year?

21. What type of scheduling is used in your library media center